

Exhibit A

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF WYOMING

HORIZON TOWER
LIMITED, LLC, and
HORIZON TOWER, LLC,
Plaintiffs,

v.

PARK COUNTY,
WYOMING; BOARD OF
COUNTY
COMMISSIONERS OF
PARK COUNTY,
WYOMING; DOSSIE
OVERFIELD, LLOYD
THIEL, LEE
LIVINGSTON, SCOTT
MANGOLD, and SCOTT
STEWART, in their official
capacity as Members of the
Board of County
Commissioners for Park
County, Wyoming;
Defendants

Civil Action No. 23-CV-0037-ABJ

EXPERT REPORT OF LEE AFFLERBACH

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I. Introduction

1. I am the Founder and Principal Engineer of CTC Media Group, INC d/b/a CTC Telecommunications Network Consulting.

My address is:

CTC Media Group, INC
1202 Pollock Street
New Bern, NC 28560

II. Summary of Qualifications

2. I am a communications systems engineer with more than 50 years of experience advising federal, state, and local government clients. I am the founder of Columbia Telecommunications Corporation, a firm that has delivered independent consulting services to federal, state, and local government clients since 1983.
3. My expertise covers a wide range of communications technologies, including urban 4/5G commercial wireless deployment, broadcasting facility design, and UHF/VHF public safety land mobile radio. My daily work involves radio frequency (RF) propagation modeling to determine the extent of coverage feasible from a given wireless facility site; I also evaluate network capacity and examine alternative wireless deployment strategies to address clients' needs.
4. I am a licensed Professional Engineer in Delaware, the District of Columbia, Maryland, North Carolina, and Washington.

Wireless Siting Expertise

5. For over two decades, I have advised and assisted local government clients in reviewing and examining options for siting commercial wireless communications facilities in a manner that is consistent with local zoning codes and federal law restrictions on local zoning authority. In this

work, I routinely perform computer modeling to determine the extent of existing and proposed coverage for a wide range of commercial wireless site applications prepared by commercial wireless carriers. As part of these evaluations, when requested by the client, I identify and examine alternative locations for proposed sitings; in addition to meeting coverage requirements, these alternative sites are intended to comply with the local government client's planning and zoning requirements.

6. I currently provide ongoing support to municipal clients evaluating options for deploying advanced cellular technology in their respective communities. I serve as CTC's project leader for the team of engineers who are examining or have recently examined wireless deployment options for more than a dozen cities in California, including the cities of Arcadia, Campbell, Burlingame, Fremont, Hillsborough, Los Angeles, Los Altos, Monterey, Napa, Palo Alto, Palos Verdes Estates, Piedmont, Rancho Palos Verdes, and Sonoma. Over the past 20 years, I have reviewed several hundred wireless site applications for both new wireless facilities and upgrades of existing wireless facilities for numerous ongoing municipal clients in the Washington DC and Baltimore metropolitan areas.
7. As part of my support to local government clients, I perform and supervise our technical team's review of wireless facilities applications, oversee field signal verification measurements, and negotiate technical options/issues with carriers' engineers. I also have provided expert witness testimony in litigation and made presentations before local planning commissions and city councils.
8. I have served as an expert witness providing testimony in support of municipal clients in their ongoing litigation with commercial wireless carriers in both state and federal courts. My assignments have included the preparation of testimony and analysis of wireless siting technical filings presented in federal court litigation for the cities of Wilmington, DE, Los Angeles, Los Altos, Hillsborough and Piedmont, CA, Pueblo County, CO, Wichita, KS, McKinney, TX, and North Buffalo Township,

PA. As directed by the courts in some of these cases, I have supported numerous communities in preparing technical alternatives to wireless carriers' initial wireless facility siting applications.

Design and Deployment of Statewide Broadband Wireless Network

9. I serve as CTC's Media Group's project leader for managing the Delaware Department of Transportation's (DelDOT) statewide 4.9 GHz high capacity, sectorized broadband wireless network. This network, with 20 core towers, interconnects the department's statewide traffic cameras, traffic signals, traffic information network, and road sensor equipment. Capacity in the network is shared with other state and local government entities.
10. This project involves the deployment of multisector access points onto existing Delaware State Police towers. It includes a hybrid 11 GHz wireless microwave/fiber optic backbone interconnection network. CTC's responsibilities include propagation modeling, site selection, oversight of installation, and proof-of-performance testing evaluation.

Land Mobile Radio (LMR) System Design

11. Early in my career, as a group leader at the MITRE Corporation, I was the project leader for a wide range of land mobile initiatives for federal agencies. For the Federal Bureau of Investigation, I assisted in site selection and frequency channel planning for the Bureau's VHF land mobile radio system. For the Drug Enforcement Administration, I established design criteria for a new generation of VHF vehicle tracking equipment.
12. At Kelly Scientific I served as a project manager on projects for the Law Enforcement Assistance Administration (LEAA), the New York State Police, and the Georgia State Patrol. My tasks involved user requirements analysis, system design, and specification preparation for land-mobile radio, computer-assisted dispatching, and 911 emergency telephone systems. This work involved RF

propagation coverage modeling, radio channel planning, and interference analysis in the VHF and UHF land mobile spectrum.

Instruction/Expertise

13. Over the course of my career, I have prepared numerous training courses on wireless communications network designs, applications, and operations. The courses have been presented at George Washington University, ITS America, University of Maryland, COMNET, University of Alabama, and the National Security Agency.

Employment History

2002 – Present Principal Engineer, CTC Media Group, INC

1983 – 2002 Founder and Principal Engineer, Columbia Telecommunications Corporation

1981 – 1983 Vice President of Engineering, The Bertman Group, Vienna, VA

1971 – 1981 Group Leader, MITRE Corporation, McLean, VA and Frankfurt, Germany

1969 – 1971 Project Manager, Kelly Scientific Corporation, Washington, D.C.

1966 – 1969 Broadcast Bureau Staff Engineer, Federal Communications Commission, Washington, D.C.

Licenses and Education

Professional Engineer, Delaware, District of Columbia, Maryland, North Carolina, and Washington

Bachelor of Science, Electrical Engineering, Drexel University

Amateur Radio License – Extra Class License W3BRH

III. Current Assignment for Park County, Wyoming

14. References in this report to “Park” or the “County” is to the Defendant in this matter. References in this report to “Horizon” or “Plaintiff” are to the Plaintiff Horizon Tower Limited, LLC in this matter. References in this report to the “Report” refer to the “Expert Report of Steven Kennedy” dated June 16, 2023.

15. Park County has retained my services to provide it with professional engineering support regarding the technical evaluation and assessment of Horizon Tower Limited applications for authority to install a 195' monopole tower which proposes to provide long-term lease space to FCC-licensed commercial wireless carriers to house wireless antennas and supporting electronic equipment at a location that the County has determined to be non-compliant with the County's zoning requirements.
16. I have reviewed all pertinent technical information provided in Horizon's application and subsequent submissions to the County, including documentation such as the County's zoning requirements, engineering design documentation, public hearing records, and the technical specifications of components and equipment to be deployed. My findings, opinions and conclusions are set forth below.

IV. Findings and Opinions

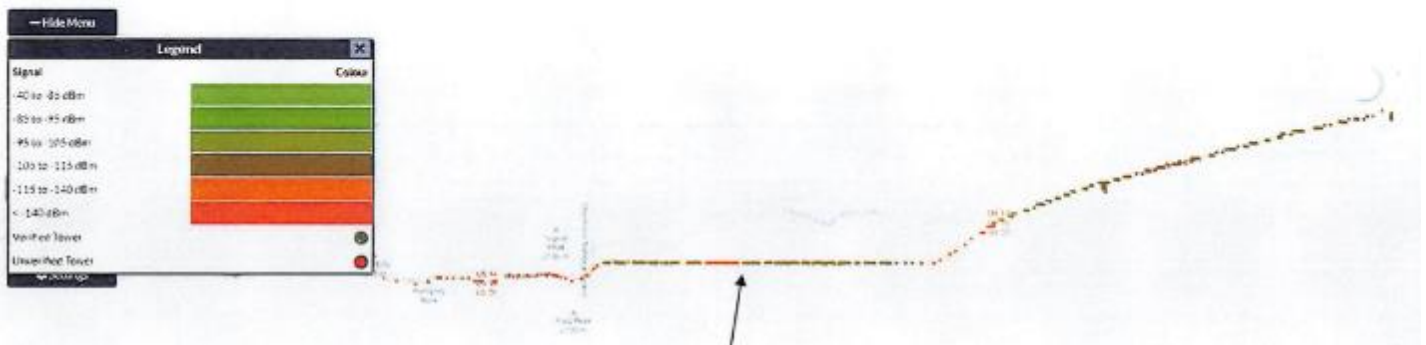
17. I concur with Mr. Kennedy that a modern commercial wireless network needs to provide a reliable signal that operates interference free, with signals of sufficient amplitude emitted from access points (towers/cell sites) providing adequate throughput capacity. Horizon has provided the County computer generated coverage modeling based on Verizon's standards. Mr. Kennedy has provided quantitative technical information in his report to support the claim that there are areas in the vicinity of the Wapiti Community that do not receive reliable in-building or in-vehicle service from existing commercial wireless carrier's network transmission facilities. I have examined the data provided and concur with their findings that signal coverage within the Wapiti community is inadequate to support reliable in-building or in-vehicle coverage. I base this conclusion on my finding that both field measures and computer modeled coverage information provided by the applicant demonstrate that

signal power in the unserved Wapiti area fall below industry target power levels of in-building coverage (-85 dBm), in-vehicle coverage (-95 dBm), and open area coverage (-105dBm).¹

In their submittal Horizon has submitted computer coverage modeling maps that confirm that the proposed site is to be constructed and will substantially enhance Verizon Wireless coverage in both the Wapiti community and along Highway 20 both east and west of the tower. Figure 1 is an exhibit submitted of the measurement data of signal power from Cody to the proposed service. It confirms that the signal power entering the Wapiti valley, in the valley and exiting to the west, falls lower than generally recommended for reliable in-vehicle coverage. While not clearly specified in the report, it appears that addressing these deficiencies is the purpose of seeking a new wireless facility in this area.

Figure 1: Verizon Measurements of Existing In-Vehicle (Cody through Wapiti Valley)

Verizon CellMapper

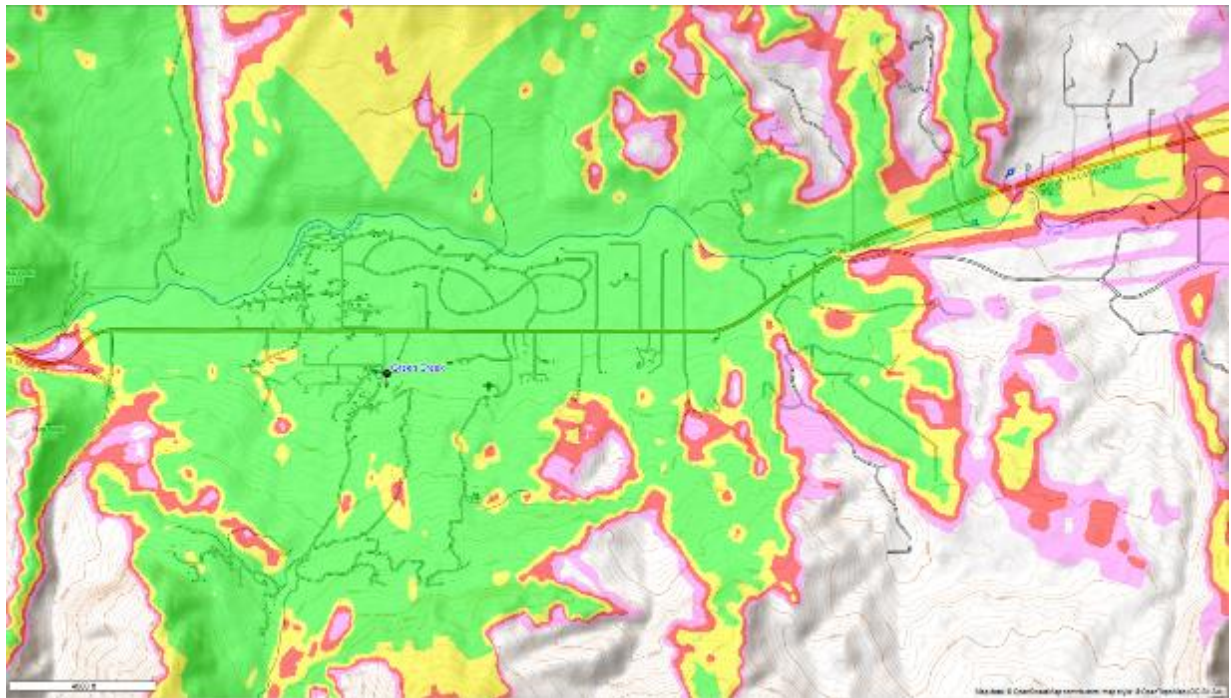


¹ These are the signal power levels typically employed by major wireless carriers in designing new transmission facilities.

18. I have independently prepared a computer-generated map of the calculated coverage employing ITU based software for the commercial wireless service coverage in the 700 MHz band with antenna at 191' above ground levels.² . Figure 2 is a map of the calculated coverage site. I was not provided with any information on the search ring area requested for this site nor specific coverage area requirements. The ITU coverage map is color coded to indicate the calculated signal power. The Appendix to this report provides additional computer modeled maps at the proposed height, 150' and 100'. It also includes a tabulation of coverage area in-building, in-vehicle, and open area at each tower height.
19. In our coverage modeling exercise, I employed typical site communications equipment (including remote radios units and antennas) used by Verizon. The Horizon tower drawings illustrate that the proposed tower is designed to accommodate up to 4 wireless carriers. As planned, the structure is intended to support up to forty-eight (48), 8' high x 20.7in. multi-band wireless antennas. From the prospective that enhancement of wireless commercial service in the Wapiti Valley and along the underserved areas along Highway 20, the proposed tower appears be a viable option. While the applicant has demonstrated a requirement to enhance wireless coverage in the Wapiti Valley for Verizon, they have not demonstrated a need to construct facilities/capacity for additional wireless carriers. Further, they demonstrated that the construction of a single tower solution is a "best fit" to serve the Wapiti community. The response at the public hearing documented significant community objection to this wireless facility. A review of the record indicates that the applicant made no attempt to consider options for concealing the facility such as reducing the number of wireless customers (height reduction), camouflage (i.e., silo, tree, fire observation tower or enclosed cylinder) or a multi-site deployment of Small Cell Wireless facilities.

² Calculate coverage mapping software compliant with the wireless coverage standards of the International Telecommunications Union (ITU) Terrestrial Land Mobile Wave Propagation in the UHF/VHF bands. https://www.itu.int/dms_pub/itu-r/opb/hdb/R-HDB-44-2002-OAS-PDF-E.pdf (Geneve, Switzerland 2002).

Figure 2: Computer Modeled Wapiti Coverage with 191' RAD Center



	> -85 dBm	In-building
	> -95 dBm	In-Vehicle
	> -105 dBm	Outdoor
	> -115 dBm	Fringe

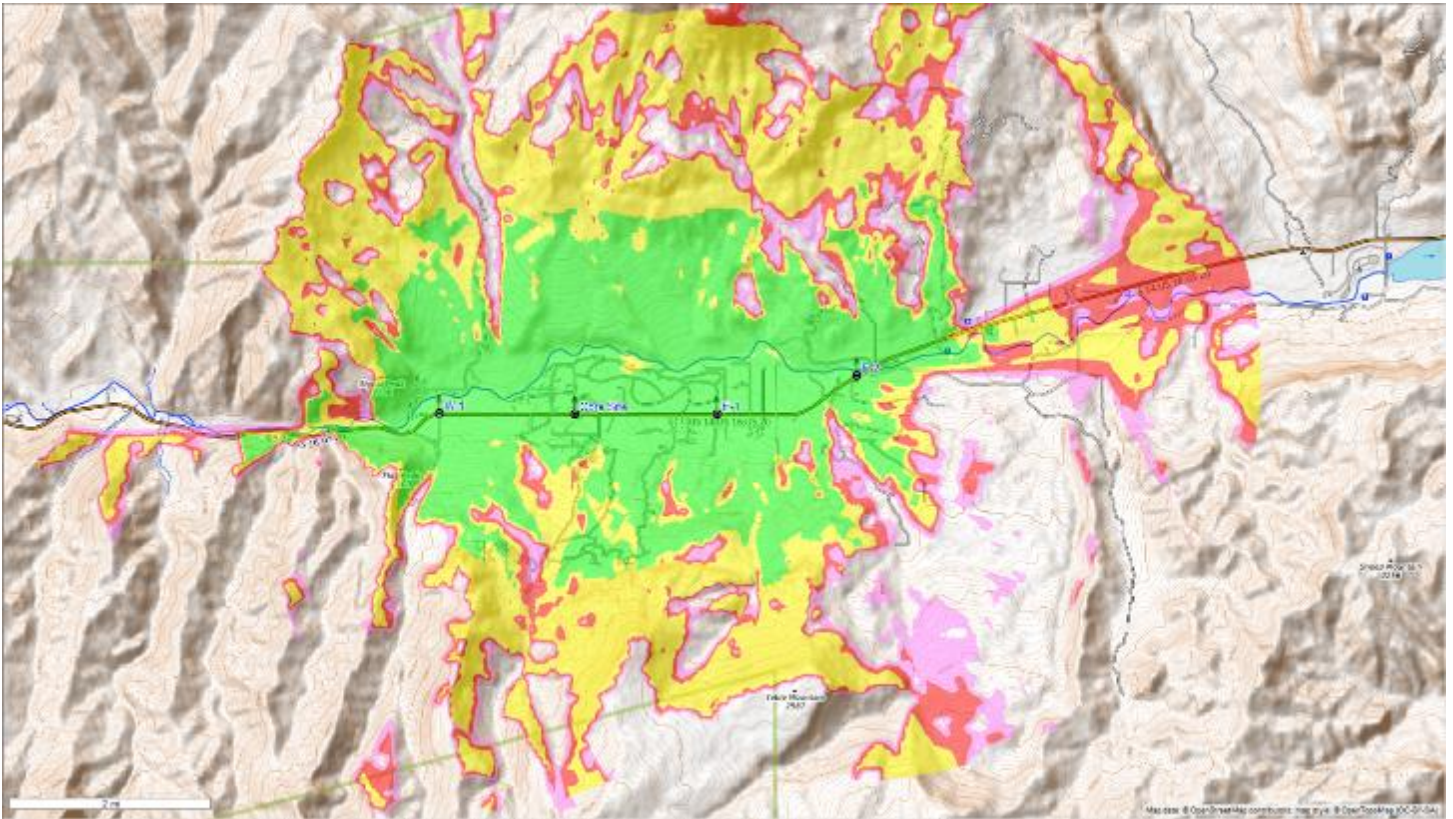
20. As proposed, this single tower serving as a structure to support an ever-expanding number of large antenna panels will be plainly visible to residents and vacation travelers attracted by the County's natural beauty and vast expanse of Yellowstone National Park. While Horizon has identified a substantial wireless coverage gap areas in the Wapiti corridor and east and west on the Yellowstone access highway, my experience has been that multi-site wireless access facilities are a very viable and are a far less visually intrusive solution. In order to facilitate rapid deployment of enhanced wireless service the Federal Communications Commission (FCC) in Docket "**Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment**"³ created provisions for fast tracking construction of distributed small wireless facilities within the public right-of-way, especially to fill in coverage gap areas lacking necessary signal power or capacity. The FCC defines a Small Wireless Facility under 47 CFR-16002 as:

- (1) The facilities— (i) Are mounted on structures 50 feet or less in height including their antennas as defined in § 1.1320(d); or (ii) Are mounted on structures no more than 10 percent taller than other adjacent structures; or (iii) Do not extend existing structures on which they are located to a height of more than 50 feet or by more than 10 percent, whichever is greater;
- (2) Each antenna associated with the deployment, excluding associated antenna equipment (as defined in the definition of antenna in § 1.1320(d)), is no more than three cubic feet in volume.
- (3) All other wireless equipment associated with the structure, including the wireless equipment associated with the antenna and any pre-existing associated equipment on the structure, is no more than 28 cubic feet in volume.
- (4) The facilities do not require antenna structure registration under part 17 of this chapter.
- (5) The facilities are not located on Tribal lands, as defined under 36 CFR 800.16(x); and
- (6) The facilities do not result in human exposure to radiofrequency radiation in excess of the applicable safety standards specified in § 1.1307(b).

³ Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment WT Docket No. 17-79
DECLARATORY RULING AND THIRD REPORT AND ORDER Adopted: September 26, 2018, FCC, Washington, DC

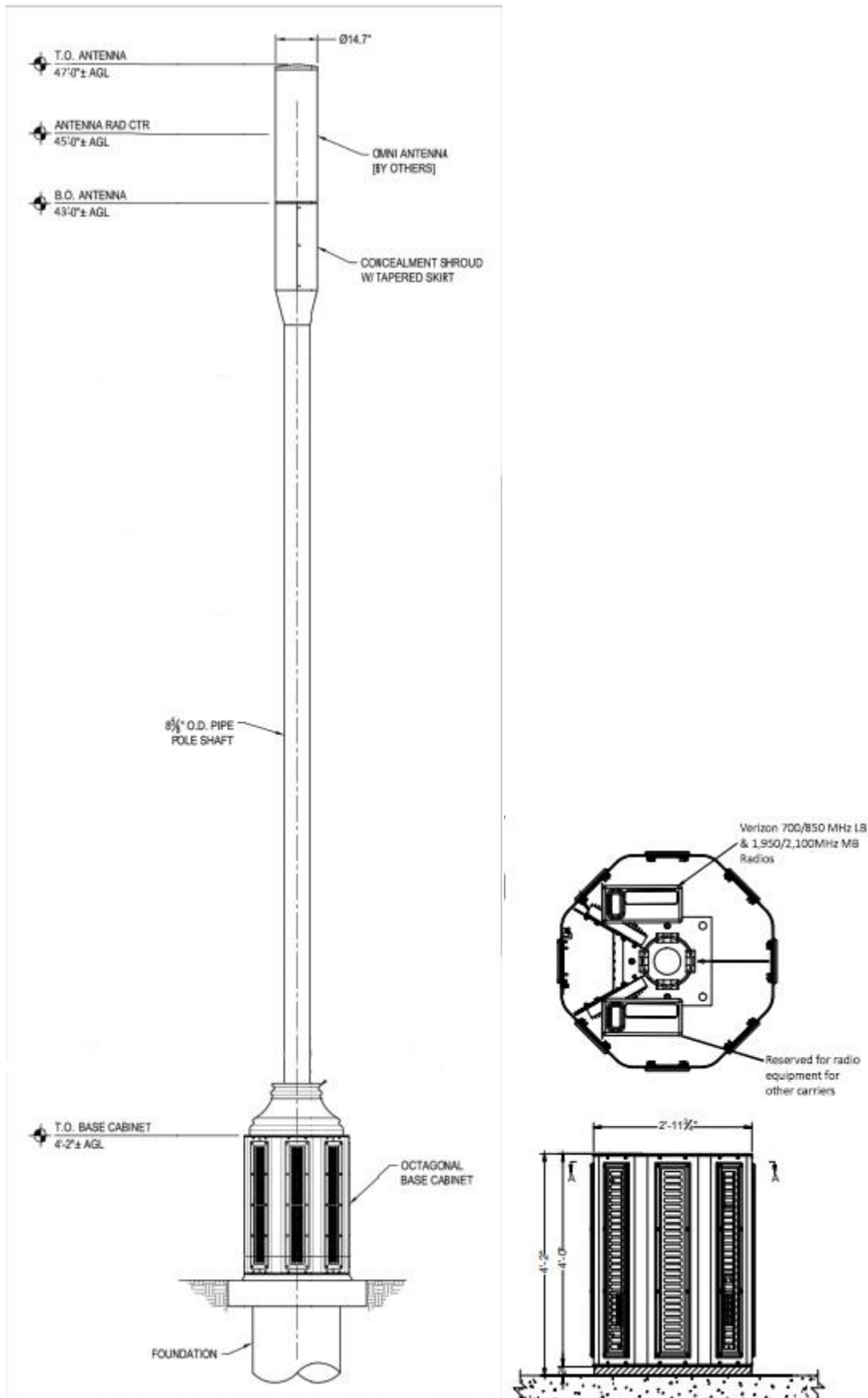
21. I have experience supporting clients in other communities across the nation that have coverage gaps in wireless coverage requiring the deployment of additional wireless sites to resolve the deficiency. Often in such situations, the single macro site options are not a viable option because of zoning restrictions or visually intrusive tower structures.⁴ The current generation of small wireless facility deployment support at each site, both 4/5 G services in all licenses low/midband wireless spectrum employ a single antenna. Typically, these smaller, less visually intrusive facilities are constructed in the public right of way as standalone facilities, replacement/upgraded streetlights or attached to existing/upgraded utility poles. Figure 3 is an example of the coverage that could be achieved in Wapiti using 45' high antennas with a distributed network of 4 small cell sites. Such facilities can be constructed with new poles in the public right of way or be integrated onto to existing utility poles. Figure 4 provides examples of the small cell antenna mounting pole and a wireless radio equipment house employed for either various siting conditions. Such equipment can be fabricated to conform with the FCC's definition for Small Wireless Facility under 47 CFR-16002. Note, in the illustration there is an option to accommodate radio equipment for a second carrier in the equipment housing as well as sharing the antenna.

⁴ Small wireless Facilities constructed for Verizon & AT&T wireless serving in California - Palo Alto, Piedmont, Napa, Piedmont, Hillsborough, and Dublin. Also, in Rye, NY and Ocean City, MD.

Figure 3: Candidate 4 Sites Small Cell 700 MHz Wireless Coverage**Coverage Signal Power in dBm**

■	>	-85	dBm	In-Building
■		-95	to -85	dBm In-Vehicle
■		-105	to -95	dBm Outside
■		-110	to -105	dBm Fringe

Figure 4: Small Wireless Facility Typical Site Configuration Equipment



V. Conclusions

22. Throughout Horizons' application documentation and public presentations to the County, as well as Mr. Kennedy's report, the applicant has claimed the need for the 195' tower to address deficient signal coverage and network capacity. While evidence presented confirms that there are significant coverage deficiencies along the Yellowstone access highway and in the Wapiti valley with in-building coverage, no empirical technical or engineering data has been provided to support the contention that all of the deficiencies will or must be resolved with this single tower facility.
23. My analysis indicates that this single tower proposed in the Wapiti valley will not address all of the wireless coverage enhancement needs of Verizon Wireless in addition to the other commercial carriers in the heavily traveled scenic 16-mile corridor between Cody and Wapiti. It is clear that the principal wireless service deficiencies exist along the highway with in-vehicle service, entering the Wapiti Valley, in the valley with service to residential buildings and in-vehicle coverage exiting the valley to the west, given these requirements, it appears the most non-obtrusive way to enhance wireless service is to install multiple wireless facilities, significantly short in height than the 195' tower requested by the applicant. Consideration should be given to installing the shorter facilities in height near Highway 20 away from residential areas, with the overall height consistent with existing aerial utility poles. I suggest that the County work with the wireless carriers to develop a master plan for siting both small wireless facilities and (limited height) macro tower site facilities that address the documented coverage issues focusing on site placement that will be minimally visually invasive.

VI. Additional Disclosures

Pursuant to Rule 26(a)(2) of the Federal Rules of Civil Procedure, I provide the following information:

I have provided radio frequency expert testimony by deposition or in trial in the following cases:

Skyway Towers LLC, and Pennsylvania RSA No.6 (II) Limited Partnership d/b/a Verizon Wireless, v. North Buffalo Township, Pennsylvania, and the North Buffalo Zoning Hearing Board, No. 2:17-cv-00664-MRH (W.D. Pa.) (September 2018)

T-Mobile Northeast LLC v. City of Wilmington Zoning Board, C.A. No. 16-1108 ER (D. Del.) (March 2019)

T-Mobile West LLC v. County of Pueblo, Colorado, Civil Action No. 17-cv-02535 CMA-STV (D. Colo.) (December 2019)

Los Angeles SMSA Limited Partnership d/b/a Verizon Wireless vs City of Los Angeles, No. 2:16-CV-04954-FLA (SK-x) (C.D. Cal.) (May 2021)

All facts of data that I considered in forming my opinions are contained in this report and set forth below:

ITU Handbook Terrestrial land mobile radiowave propagation in the VHF/UHF bands
(https://www.itu.int/dms_pub/itu-r/opb/hdb/R-HDB-44-2002-OAS-PDF-E.pdf)

FCC - Universal Licensing System

FCC- Antenna Structure Registration

FCC- Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment WT Docket No. 17-79 DECLARATORY RULING AND THIRD REPORT AND ORDER Adopted: September 26, 2018, FCC, Washington, DC

Engineering design documents provided by the applicant.

Technical information from wireless equipment manufacturers' specifications is available on the web (antennas, remote radios, etc.)

Applicant's Verizon Wireless file

Power point PDF prepared by applicant for public briefings.

Park County zoning code

My compensation for the services provided or expected to be provided in this matter is \$200 per hour, plus expenses, for my time, and \$180-150 per hour, plus expenses, for my support staff's time.

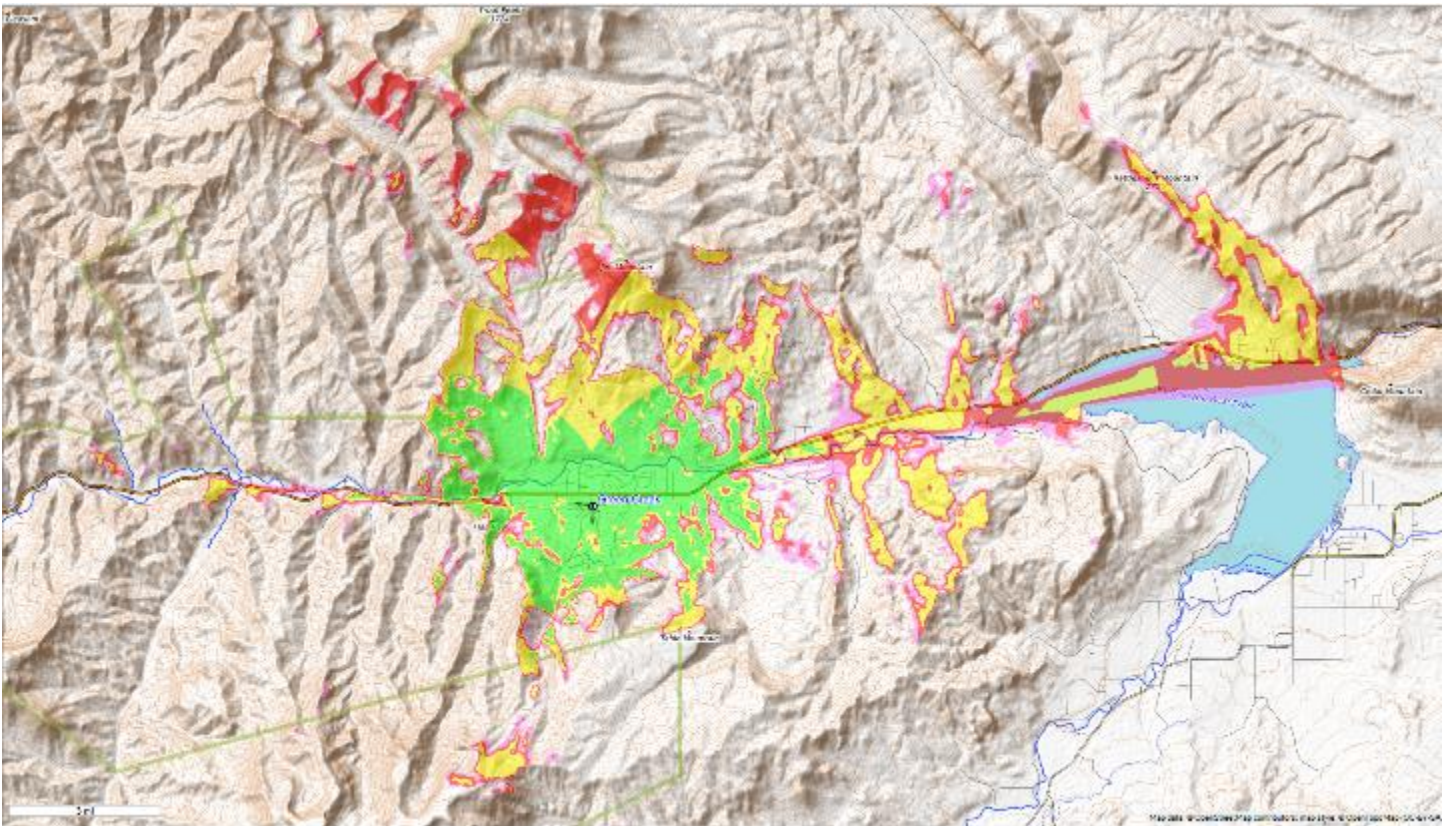
Dated: August 18, 2023

By: 
Lee Afflerbach

Appendix

Appendix Figure 1: 700 MHz Computer Generated Coverage Model Antenna at 191 Ft.	16
Appendix Figure 2: 700 MHz Computer Generated Coverage Model Antenna at 150 Ft.	18
Appendix Figure 3: 700 MHz Computer Generated Coverage Model Antenna at 100 Ft.	20

Appendix Figure 1: 700 MHz Computer Generated Coverage Model Antenna at 191 Ft.



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RadioPlanner 2.1

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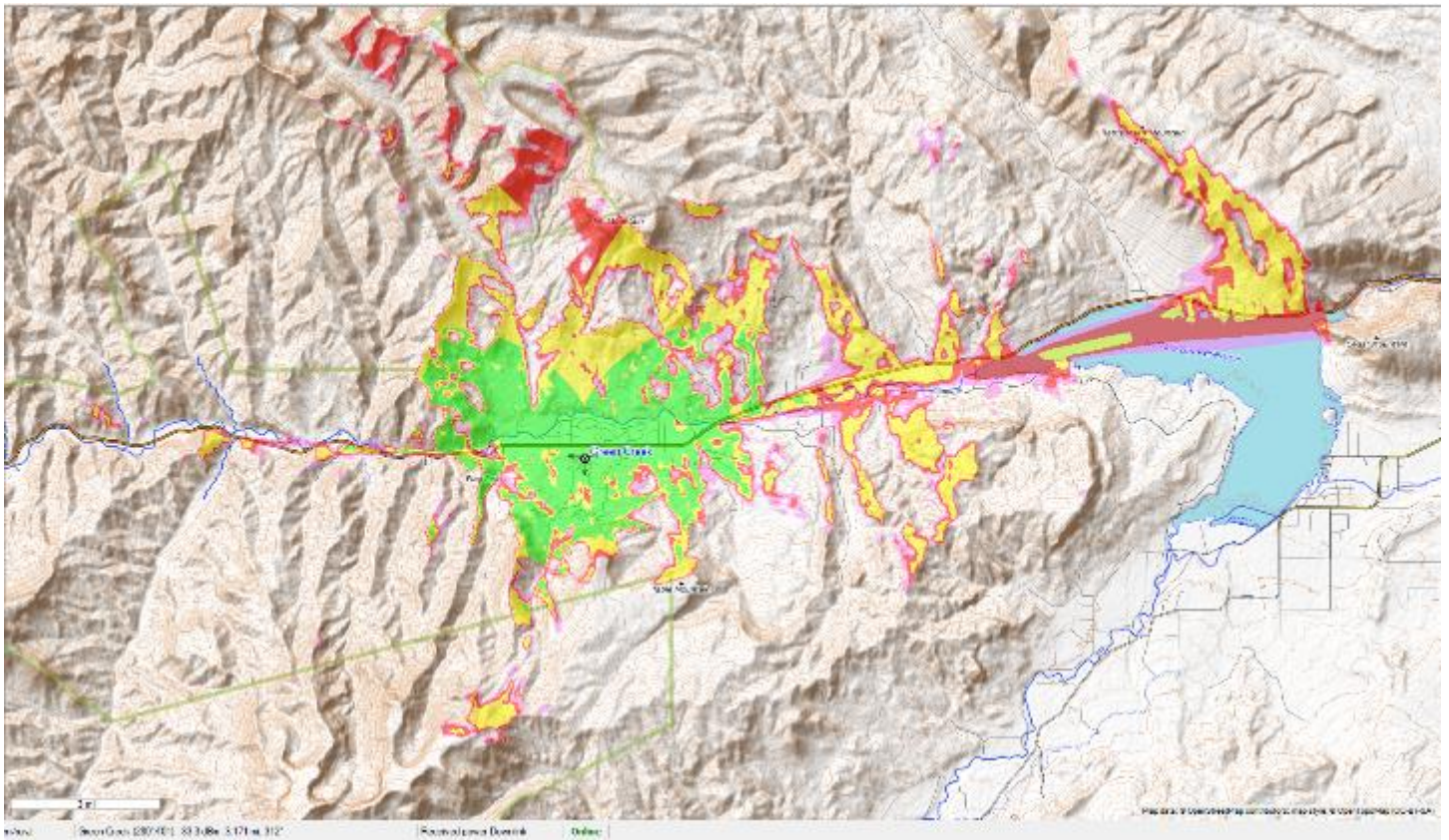
Project name:	New Project 2023/07/26
Customer:	Park County
Data:	2023/07/26 08:47
Radio System Type:	Mobile Radio Communication
Frequency:	700 MHz
Propagation Model Type:	ITU-R P.1812-4
Percentage of time:	90%
Percentage of location:	90%
Margin:	0 dB
Mobile unit location:	Mobile unit with antenna below clutter height in urban or suburban environments
Clutter loss:	No
Area Study Type:	Received power Downlink
Co-channel interference:	No
Adjacent channel interference:	No

	Mobile Unit №1		Coverage area
	> -85 dBm	In-building	14.8 mi ²
	> -95 dBm	In-Vehicle	35.9 mi ²
	> -105 dBm	Outdoor	52.2 mi ²
	> -115 dBm	Fringe	64.6 mi ²

Base Stations Parameters

№	Name	Latitude Longitude	Sector azimuth	Antenna model	Antenna height	Antenna beam tilt	Antenna gain, dBi	Tx power, W	Loss, dB
1	Green Creek	N44.458961°	75°	FILEJAHH-65B-R3B_Port 1 +45_02DT_0716	191 ft	0°	14.9	0.16	0
		W109.488361°	180°	FILEJAHH-65B-R3B_Port 1 +45_02DT_0716	191 ft	0°	14.9	0.16	0
			280°	FILEJAHH-65B-R3B_Port 1 +45_02DT_0716	191 ft	0°	14.9	0.16	0

Appendix Figure 2: 700 MHz Computer Generated Coverage Model Antenna at 150 Ft.



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RadioPlanner 2.1

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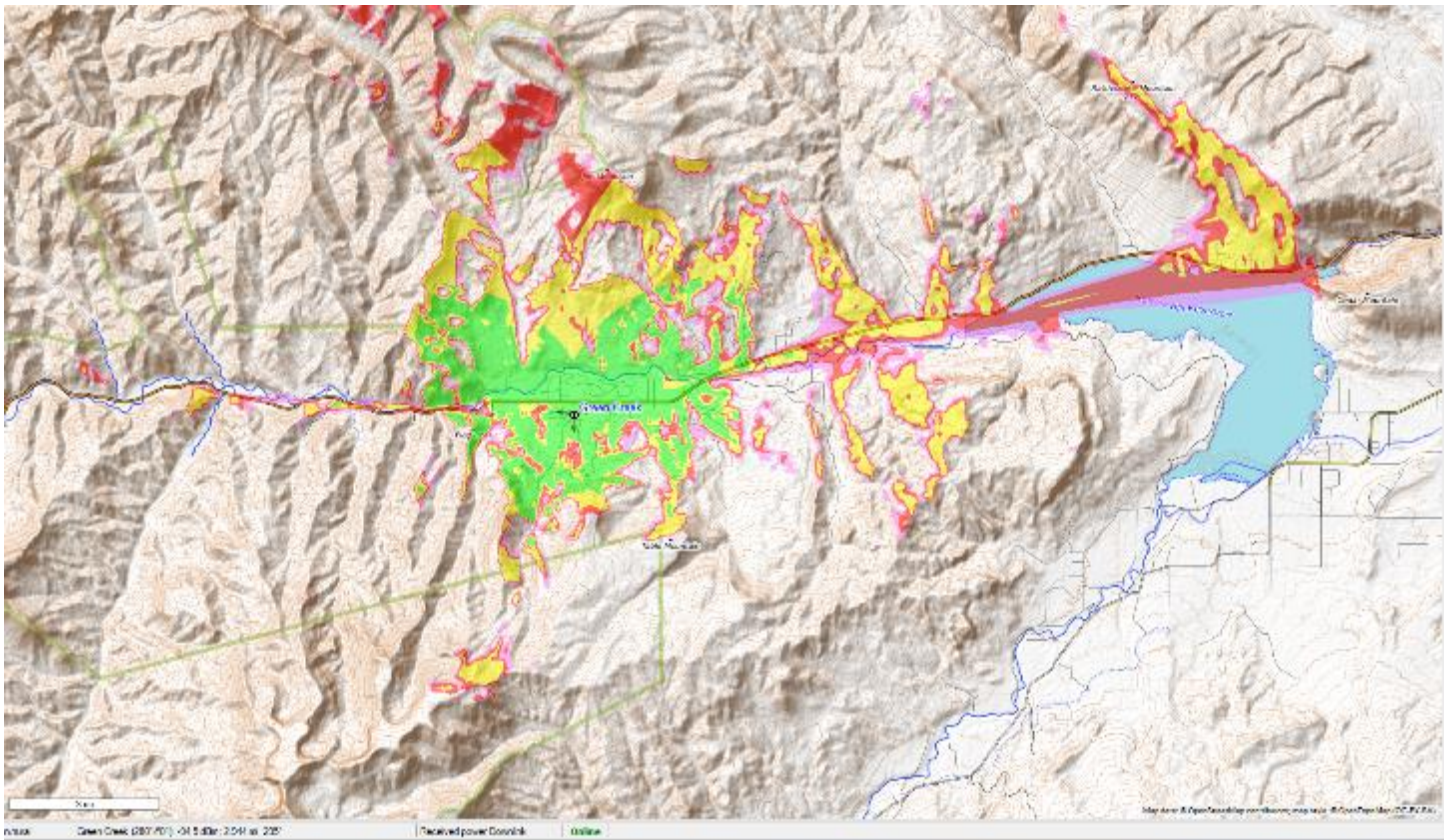
Project name:	New Project 2023/07/26
Customer:	Park County
Data:	2023/07/26 08:47
Radio System Type:	Mobile Radio Communication
Frequency:	700 MHz
Propagation Model Type:	ITU-R P.1812-4
Percentage of time:	90%
Percentage of location:	90%
Margin:	0 dB
Mobile unit location:	Mobile unit with antenna below clutter height in urban or suburban environments
Clutter loss:	No
Area Study Type:	Received power Downlink
Co-channel interference:	No
Adjacent channel interference:	No

	Mobile Unit №1		Coverage area
	> -85 dBm	In-building	14 mi ²
	> -95 dBm	In-Vehicle	34.2 mi ²
	> -105 dBm	Outdoor	50.5 mi ²
	> -115 dBm	Fringe	62.9 mi ²

Base Stations Parameters

№	Name	Latitude Longitude	Sector azimuth	Antenna model	Antenna height	Antenna beam tilt	Antenna gain, dBi	Tx power, W	Loss, dB
1	Green Creek	N44.458961°	75°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	150 ft	0°	14.9	0.16	0
		W109.488361°	180°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	150 ft	0°	14.9	0.16	0
			280°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	150 ft	0°	14.9	0.16	0

Appendix Figure 3: 700 MHz Computer Generated Coverage Model Antenna at 100 Ft.



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RadioPlanner 2.1

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Project name:	New Project 2023/07/26
Customer:	Park County
Data:	2023/07/26 08:47
Radio System Type:	Mobile Radio Communication
Frequency:	700 MHz
Propagation Model Type:	ITU-R P.1812-4
Percentage of time:	90%
Percentage of location:	90%
Margin:	0 dB
Mobile unit location:	Mobile unit with antenna below clutter height in urban or suburban environments
Clutter loss:	No
Area Study Type:	Received power Downlink
Co-channel interference:	No
Adjacent channel interference:	No

	Mobile Unit №1		Coverage area
	> -85 dBm	In-building	12.9 mi ²
	> -95 dBm	In-Vehicle	31.8 mi ²
	> -105 dBm	Outdoor	48 mi ²
	> -115 dBm	Fringe	60.5 mi ²

Base Stations Parameters

№	Name	Latitude Longitude	Sector azimuth	Antenna model	Antenna height	Antenna beam tilt	Antenna gain, dBi	Tx power, W	Loss, dB
1	Green Creek	N44.458961°	75°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	100 ft	0°	14.9	0.16	0
		W109.488361°	180°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	100 ft	0°	14.9	0.16	0
			280°	FILEJAHH-65B- R3B_Port 1 +45_02DT_0716	100 ft	0°	14.9	0.16	0